

II. HEART DISEASE AND ITS TREATMENT

About Heart Disease

Heart disease is the leading cause of death among adults, both nationally and in California (American Heart Association, 1998). In 1995, 481,278 Americans died from coronary heart disease. Each year, approximately 27,000 Californians who have advanced heart disease undergo CABG surgery to help reduce pain and disability and to increase length of life.

When one of the coronary arteries is blocked or narrowed (the narrowing is called a *stenosis*), the blood supply to the heart muscle is reduced. This can lead to severe chest pain (*angina*) that can restrict a person's ability to perform normal activities or can cause a heart attack. In severe cases it can be life-threatening. Patient factors associated with a higher risk of heart disease include family history of heart disease, smoking, high blood pressure, elevated cholesterol, being overweight or obese, diabetes mellitus, and physical inactivity.

Treatment Options for Heart Disease

Treatment for patients with heart disease varies depending on the extent and severity of illness. Treatment options include:

- ***Lifestyle changes:*** including quitting smoking, improving the patient's diet to lower "bad" cholesterol (LDL) and to reduce weight, and starting a formal exercise program that improves cardiovascular fitness, thereby decreasing cardiac event rates and mortality;
- ***Medical management:*** use of aspirin, control of blood pressure, ACE inhibitors in appropriate patients, anti-anginal therapy with beta blockers and/or nitrates and/or calcium channel blockers, and cholesterol lowering medications to achieve an LDL < 100 mg/dl; and,
- ***Interventional procedures:*** such as angioplasty (Percutaneous Transluminal Coronary Angioplasty or PTCA) and CABG surgery.

The decision between these three therapies can often be difficult and should be based on the specific condition of the patient. If a patient is treated "maximally" with medications and still has symptoms, it is often necessary to proceed to either angioplasty or bypass surgery.

Angioplasty (PTCA) is a therapy commonly used to treat patients with heart disease and, in some cases, can be an alternative to coronary bypass surgery. Angioplasty is a technique in which a tiny deflated balloon is threaded through the blood vessels until it reaches the blockage. The balloon is then slightly inflated to open the blockage. When the balloon is removed, more blood can pass through the larger opening. In some cases, a thin tube (a *stent*) is inserted into the artery and left in place. Not all patients are good candidates for this procedure.

CABG surgery is the most common open-heart surgery performed today. In this surgery, a substitute blood vessel (*graft*) is attached on the surface of the heart to create a new path for

blood to bypass a blocked or diseased coronary artery. The grafts are segments of vein removed from the leg and/or an artery from the underside of the chest wall (e.g., *internal mammary artery*). The arteries bypassed are less than 1/4 inch in diameter, about the size of spaghetti. Most patients will receive more than one bypass graft. A "triple" bypass procedure means that three new paths were created to bypass three blocked coronary arteries.

In the standard bypass surgery, the breast bone is divided vertically to expose the heart, which lies just behind the bone (*sternum*). New surgical techniques also are emerging (e.g., minimally invasive approaches), where surgeons make alternative incisions that are smaller and that may, in the future, prove less painful, cosmetically more acceptable, and shorten the recovery time compared to the standard incision. This approach is still considered unproven, and the benefit of this approach over the standard approach has not been confirmed.

No surgical procedure is completely safe, but the chance of dying from bypass surgery—known as the **mortality rate**—is very low. Nationally, 2.8% of all patients who undergo CABG surgery die from complications during or after the operation (The Society of Thoracic Surgeons, 1997). Of course, a patient's overall health prior to the surgery will affect his or her chances of survival, which may be higher or lower than 2.8%. A patient's doctor can assess each individual's health condition and discuss the risks associated with the operation. Considering that this operation did not exist a generation ago, and considering how sick most bypass patients are (the severity of their disease), this is a remarkably low mortality rate.

The two kinds of physicians involved in heart care are cardiologists, who specialize in diagnosing and treating diseases of the heart, and cardiac surgeons, who perform the bypass surgery. If bypass surgery is needed, a cardiologist will refer the patient to a cardiac surgeon. For bypass surgery, important medical functions are also performed by nurses, both during surgery and afterward when the patient is recovering; the anesthesiologist (a doctor who administers anesthesia to put the patient to sleep); the perfusionist (who operates the heart-lung machine during surgery); and various other surgical assistants. The quality of care a patient receives and his or her surgical outcome depend on the performance of all of these medical professionals working together as a team.

Choosing a Treatment

Prior to making a decision to have heart surgery, patients should discuss with their doctor all the available treatment options. Each patient needs to balance the different benefits and risks associated with each option in making a treatment decision. For a substantial number of patients who undergo CABG surgery the decision to have bypass surgery is either urgent or emergent (that is, the surgery needs to be done soon after the diagnosis is made). Among the patients included in this report, about half of the cases were urgent or emergent. Consequently, patients with known heart disease should consider their options for selecting a hospital and surgical team for treatment well in advance of when they may actually need the surgery.

Scientific studies on heart surgery show that, on average, hospitals that perform a higher volume of coronary bypass procedures tend to achieve better outcomes—meaning they tend to have a lower death rate from the operation (Farley, 1992; Hannan et al., 1989; Hannan et al. 1991; Showstack et al., 1987). In 1991, the American College of Cardiology recommended that

hospitals perform a yearly minimum of 200-300 open-heart operations, the majority of which are coronary artery bypass operations (ACC, 1991). The number of bypass surgeries a hospital performs (i.e., volume of cases) is a proxy measure for quality, given that a host of research studies have shown a relationship between volume and outcome. While case volume may provide an indirect measure of performance, the volume of bypass cases alone does not provide full information about the quality of care provided at that institution.

Specifically, selecting a hospital that performs many bypass surgeries each year is not, by itself, a guarantee that a patient will achieve good results. Some hospitals do other kinds of heart surgery besides bypasses—such as heart valve repairs in combination with bypass surgery and heart transplants—that help them gain expertise in performing cardiac surgery. The research literature has shown that, on average, hospitals that perform a higher volume of open heart surgeries of all types usually develop greater expertise and achieve better surgical outcomes, as measured by lower mortality rates. It is therefore important that one consider not only the number of bypass surgeries performed by an institution but also the total number of cardiac or open-heart surgeries of all types.

Another important contributor to good surgical outcomes not captured in volume data is how well the entire team of cardiac surgeons, cardiologists, perfusionists, anesthesiologists, and nurses work together, not only during surgery but before and after. With effective teamwork, good surgical outcomes can occur at hospitals that perform few surgeries as well as at hospitals that perform many.

Given the above, studies that measure actual outcomes typically provide better information on the quality of care delivered by a hospital. Outcome measures of quality include mortality rates, complication rates, and readmission rates. Ideally, mortality rates will be risk-adjusted to account for differences in patient case-mix across different hospitals. For example, some hospitals refer more complicated cases to other hospitals with more experience in managing difficult cases. Because these patients may be more likely to die, the hospitals that receive these referrals should not be penalized for a higher mortality rate. Risk-adjustment models level the playing field between hospitals by controlling for different levels of patient health. This study presents risk-adjusted mortality rates for hospitals in California that perform bypass surgeries.

